Informing cannabis prevention: Surveillance and marketing

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- Funding from NIH, FDA, and HRSA
- No other financial relationships to disclose.
- No industry funding; no off-label medications use discussed
- The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration.

http://www.med.uvm.edu/behaviorandhealth/home



Areas of focus





MILBANK QUARTERLY

Original Investigation Waiting for the Oppo Tobacco Industry and N

RACHEL ANN BARRY, and STANTON

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OPINION

Big tobacco is coming for legal marijuana

It's no coincidence that in 2018 Altria, which owns the Marlboro brand, invested \$1.8 billion in a cannabis company and \$12.8 billion in JUUL, a nicotine vape product. By Shaleen Title and Andy Tan Updated April 8, 2021, 3:00 a.m.





Overview

- Cannabis surveillance: Adolescents & young adults
 - Beliefs
 - Harm perceptions
 - Use
 - Impact of adult-use policies
- Cannabis marketing & counter-marketing
 - Efficacy of existing campaigns
 - Impact of marketing and counter-marketing on beliefs, harm perceptions and use



Past-year initiation of substance use by age group, NSDUH 2019



https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUH DetailedTabs2019/NSDUHDetTabsSect4pe2019.htm



Mean Age at First Substance Use among Past Year Initiates Aged 12 to 49, NSDUH 2019



https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUH DetailedTabs2019/NSDUHDetTabsSect4pe2019.htm



In adolescents, marijuana is increasingly the first substance tried



Keyes KM, Rutherford C, Miech R. *Drug Alcohol Depend*. 2019;194:51-58. PubMed PMID: 30399500. PubMed Central PMCID: PMC6390293.



In adolescents, marijuana is increasingly the first substance tried



Keyes KM, Rutherford C, Miech R. *Drug Alcohol Depend*. 2019;194:51-58. PubMed PMID: 30399500. PubMed Central PMCID: PMC6390293.



Why does marijuana use in young people matter?

- 1. Impact on health (NASEM 2017)
 - Motor vehicle crashes
 - Risk of overdose injuries, including respiratory distress
 - Cognitive impairment
 - Development of schizophrenia and other psychoses
 - *Emerging*: Trends in cannabis use and suicidality



Suicidality and cannabis use in adults aged 18-34, NSDUH 2008-2019

Figure. Adjusted Past-Year Prevalence of Suicidal Ideation, Suicide Plan, and Suicide Attempt by Depression, Cannabis Use (CU) and CU Disorder (CUD), and Sex



Han B, Compton WM, Einstein EB, Volkow ND. JAMA Netw Open. 2021;4(6):e2113025 Vermont Center on PubMed PMID: 34156452. PubMed Central PMCID: PMC8220498.

Why does marijuana use in young people matter?

2. Impact on development of substance use disorder

Table. Prevalence of Specific Substance Use Disorders Among Individuals With Lifetime Substance Use Aged 12 to 25 Years by Time Since First Substance Use"

	Weighted % (95% CI)					
Measure	().	Time since initiation, mo				
	Total	s12	>12-≤24	>24-≤36	>36	P value
Lifetime cannabis use, age 12-17 y			<u> </u>		• •	
Na.	10800	3500	3300	2000	2100	NA
12-mo Cannabis use disorder						
Unadjusted	15.1 (14.3-16.0)	8.5 (6.2-7.4)	14.0 (12.5-15.5)	18.7 (16.6-20.9)	25.1 (22.8-27.6)	<.001
Adjusted	NA	10.7 (9.3-12.3) ^b	14.6 (13.2-16.2) ^b	16.8 (15.0-18.8) ^b	20.1 (18.0-22.3) ^b	<.001
Lifetime cannabis use, age 18-25 y						
No.	35100	2100	3300	3800	26 000	NA
12-mo Cannabis use disorder						
Unadjusted	10.2 (9.8-10.7)	4.8 (3.8-6.1)	7.8 (6.7-9.0)	9.4 (8.2-10.7)	11.1 (10.6-11.7)	<.001
Adjusted	NA	6.4 (5.2-7.9)	8.5 (7.4-9.8)	9.1 (8.0-10.4)	10.9 (10.3-11.4)	<.001

Volkow ND, Han B, Einstein EB, Compton WM. JAMA Pediatrics. 2021;175(6):640-643. PubMed PMID: 33779715. PubMed Central PMCID: PMC8008418.



Why does marijuana use in young people matter?

- **3. Impact on trial/use of other substances** (NASEM 2017)
 - Bi-directional associations with tobacco and alcohol use in youth (Silveira 2018 Drug Alcohol Depend)
 - Increased initiation, persistence, and relapse to cigarette smoking in adults (Weinberger 2018 J Clin Psychiatry; Weinberger 2020 Nicotine Tob Res)
 - Alcohol dependence and alcohol-associated adverse effects in adolescents and young adults (Ramadan 2020 J Cannabis Res)



RAND > Press Room > News Releases > 2019 >

Using Cannabis and Tobacco/Nicotine Together Is Linked to Heavier Use and Poorer Functioning Among Young Adults



FOR RELEASE Monday April 29, 2019

Media Resources

RAND Office of Media Relations

(703) 414-4795 (310) 451-6913 media@rand.org

Researcher Spotlight

More than a third of young adults report using both cannabis and tobacco or nicotine products, providing a unique challenge to public health officials as cannabis is legalized in more jurisdictions, according to a new RAND Corporation study.

https://www.rand.org/news/press/2019/04/29.html



[Substance] use does not exist in a vacuum

<u>e</u>	Pattern popularity l	Pattern	25+ year olds (unweighted $n=23,210$)		
Pattern	Pattern popularity age 18–24	No current use* Alcohol-only use*	Prevalence (weighted) (%)		
No current use*	1	Alconol/cigarettes co-use	36.3		
Alcohol-only use*	2	Cigarettes-only use*	32.2		
Alcohol/cigarettes co-use*	3	Alcohol/marijuana co-use*	5.4		
Cigarettes-only use*	4		5.5		
Alcohol/marijuana co-use*	5	Alcohol/hookah co-use*	1.1		
Alcohol/hookah co-use*	6	Alcohol/cigarettes marijuana	.2		
co-use* Alcohol/cigarettes/e-cigarette co-use Alcohol/cigarettes/marijuana/	8	co-use* Alcohol/cigarettes/e-cigarette co-use	1.4		
Alcohol/cigarettes/cigar	10	Alcohol/cigarettes/marijuana/	.8		
Cigarettes/e-cigarette co-use*	3 <u></u> 0	cigar co-use*	1.2		
Alcohol/cigar co-use	-	Alcohol/cigarettes/cigar	1.1		
Alcohol/other tobacco co-use	2 <u></u> 0	r neonon ergareacos ergar	1.0		
All other patterns*		co-use*	12.6		
"-" indicates pattern popularity belo *Significant difference by age group	we top 10 rank within age group of $p < 0.05$.	Cigarettes/e-cigarette co-use* count. Alcohol/cigar co-use			



Cohn AM, Johnson AL, Rose SW, Fearson JL, Villand AC, Stanton C. Am J Addict. 2018;27(6):491-500. PubMed PMID: 30152111.

All other patterns*

HOW DOES VERMONT COMPARE TO THE U.S.?

How does Vermont differ from national trends? Past month use

Adolescents





How does Vermont differ from national trends? Past month use

Young adults





How does Vermont differ from national trends? Harm perceptions

Adolescents

Prevalence of Perceptions of Great Risk from Smoking One or More Pack of Cigarettes per Day



Prevalence of Perceptions of Great Risk from Having Five or More Drinks of an Alcoholic Beverage Once or Twice a Week



Prevalence of Perceptions of Great Risk from Smoking Marijuana Once a Month





How does Vermont differ from national trends? Harm perceptions

Young adults

Prevalence of Perceptions of Great Risk from Smoking One or More Pack of Cigarettes per Day



Prevalence of Perceptions of Great Risk from Having Five or More Drinks of an Alcoholic Beverage Once or Twice a Week



Prevalence of Perceptions of Great Risk from Smoking Marijuana Once a Month





Harm perceptions \rightarrow Behavior

- Lower harm perceptions of tobacco products predict subsequent tobacco use behavior, including initiation.
- Greater perceived risk of marijuana protects against use in youth.





Vermont vs. other states with adult-use cannabis sales

Past-month marijuana use in young adults aged 18-25, pre- and post-implementation of adultuse policies permitting cannabis sales, NSDUH Opening Past-month marijuana use Past-month marijuana use date of first Date in young adults in young adults (Post-implementation) retailers (Pre-implementation) State passed Colorado 2012 Jan-14 29.05 31.75 Jul-14 25.56 Washington 2012 21.87 Alaska 25.02 2014 Oct-16 26.27 Oregon Oct-16 26 29 33 15 2014 Nevada Jul-17 18.25 31.49 2016 California 2016 Jan-18 24.07 26.48 Massachusetts 2018 Nov-18 30.27 31.01 Oct-22 38.99 Vermont* 2020 Not yet available



Outcomes in other states with cannabis sales?

- Washington:
 - Decrease in perceived harm of marijuana and increase in frequent marijuana use in adolescents post-legalization (Fleming 2016 J Adolesc Health)

Colorado:

 No effect on perceived harm or marijuana use in adolescents, but perceived ease of access increased (Harpin 2018 Subst Use Misuse)

• Oregon:

 Increase in past 30-day marijuana use prevalence in undergrads, decrease in past 30-day tobacco use; did not differ by age (18-20 vs. 21-26) (Kerr 2018 *Psychol Addict Behav*)



National evaluations of recreational marijuana legalization

- Ages 12+
 - Small increase in past-year cannabis use disorder in adolescents; no impact on young adults; increased frequent use and CUD in adults aged 26+ (Cerda 2019 JAMA Psychiatr)
- College students
 - Increased past 30-day marijuana use prevalence, particularly among females, living off-campus, aged 21+ (Bae 2020 Addiction)
 - Decreased binge drinking prevalence in those aged 21+, increased sedative misuse in those <21 (Alley 2020 Addict Behav)





UVM/Health Partnership





University of Vermont CANCER CENTER



The University of Vermont

LARNER COLLEGE OF MEDICINE



Our goal is to understand the impact of state-level policies and communication campaigns on substance use beliefs and behaviors in young Vermonters.



PACE Vermont tracks in real-time



Past-month substance use



PACE Vermont NSDUH 2018-2019



Wave 1, Spring 2019

Beliefs about marijuana in young adults

	Total				
	(n = 1.037)				
	(,,				
	Weighted % (n)				
Harm risk from weekly marijuana use					
Great risk	8.2 (83)				
Moderate risk	21.7 (229)				
Slight risk	42.2 (452)				
Norisk	27.8 (272)				
Regular marijuana use during early years of life can negatively affect attention					
Agree	78.8 (811)				
Disagree	11.5 (120)				
Don't know	9.7 (105)				
Approximately 1 in 6 teens who start using marijuana before age 14 develop addiction					
Agree	55.6 (567)				
Disagree	26.2 (269)				
Don't know	18.2 (199)				
Teens who use marijuana have lower academic performance and worse job prospects					
Agree	44.6 (439)				
Disagree	38.3 (405)				
Don't know	17.1 (191)				
Teens who use marijuana weekly or more often have twice the risk of depression					
Agree	59.5 (593)				
Disagree	22.7 (250)				
Don't know	17.8 (192)				
What substance in marijuana makes a person high?					
Incorrect	10.6 (91)				
Correct (THC)	85.9 (903)				
l don't know	3.5 (43)				



Wave 1, Spring 2019

West et al., under review.

Perceived addictiveness

How addictive do you think each of the following substances are?





Wave 2, Summer 2019

West et al., in preparation.

"Classes" of beliefs

- Four latent classes of addiction beliefs.
 - Class 2 largely defined by low perceived addictiveness of marijuana, moderate perceived addictiveness of alcohol.
- Older adolescents/YA more likely to be in Classes 2 or 3 (vs. Class 1).
- Ever EVP, marijuana, alcohol use higher in Class 2 than Class 1.
- Past 30-day tobacco, marijuana, alcohol use higher in Class 2 than Class 1.



West et al., in preparation.

	Class 1	Class 2	Class 3	Class 4	Total
	"High perceived addictiveness"	"Low perceived addictiveness of marijuana/mod alcohol"	"Mixed perceived addictiveness"	"Low perceived addictiveness"	(n = 1,168)
	(n = 346; 30%)	(n = 684; 59%)	(n = 93; 8%)	(n = 45; 4%)	
	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %
Caffeine					
.ow	12.7%	31.7%	34.0%	59.9%	22.5%
Moderate	35.1%	32.0%	40.3%	23.5%	34.1%
ligh	52.2%	36.3%	25.7%	16.6%	43.4%
ow	0.0%	33.2%	28.6%	97.6%	16.8%
Moderate	9.1%	66.8%	44 7%	2 4%	33.0%
ligh	90.9%	0.0%	26.7%	0.0%	50.2%
Marijuana					
	28.0%	56.2%	41 7%	86.7%	40 9%
Moderate	20.0%	33.1%	28.0%	4 5%	26 5%
ligh	49.2%	10.7%	30.3%	8.8%	32.6%
lectronic vanor prov	ducts				
	3 7%	2.2%	40 7%	88 1%	8 1%
Moderate	11 4%	12 5%	47.4%	11.9%	14.6%
ligh	84.9%	85.3%	11.9%	0.0%	77.3%
licotine					
ow	0.2%	0.7%	5.7%	100.0%	3.2%
Aoderate	1.6%	3.0%	62.0%	0.0%	6.8%
ligh	98.2%	96.2%	32.3%	0.0%	90.0%
Cigarettes					
.ow	0.0%	0.0%	25.5%	100.0%	4.4%
Aoderate	1.9%	1.2%	55.7%	0.0%	5.8%
ligh	98.1%	98.8%	18.8%	0.0%	89.8%
Opioids					
.0W	0.4%	0.8%	8.2%	75.0%	3.0%
Moderate	1.8%	2.5%	5.1%	3.3%	2.4%
ligh	97.8%	96.8%	86.8%	21.7%	94.7%

SUBSTANCE USE & MISUSE 2017, VOL. 52, NO. 2, 203–213 http://dx.doi.org/10.1080/10826084.2016.1223688



Support for Marijuana Legalization and Predictors of Intentions to Use Marijuana More Often in Response to Legalization Among U.S. Young Adults

Amy M. Cohn^{a,b,c}, Amanda L. Johnson^a, Shyanika W. Rose^a, Jessica M. Rath^{d,e}, and Andrea C. Villanti^{a,e}

^aThe Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, Washington, DC, USA; ^bDepartment of Oncology, Georgetown University Medical Center, Washington, DC, USA; ^cCancer Prevention and Control Program, Georgetown Lombardi Comprehensive Cancer Center, Washington, DC, USA; ^dDepartment of Evaluation Science and Research, Truth Initiative, Washington, DC, USA; ^oDepartment of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

> 40% of our national sample of young adults favored legalizing marijuana, and

Taylor & Francis

Taylor & Francis Group

• 14% indicated intentions to use it more frequently post-legalization

Cohn AM, Johnson AL, Rose SW, Rath JM, Villanti AC. Subst Use Misuse. 2017;52(2):203-213. PubMed PMID: 27976988.

Awareness of state marijuana policy (2019)

- Marijuana law recently changed in Vermont. Which of the following best describe Vermont's new marijuana law?"
 - 1) Legal for anyone to use
 - 2) Legal for people 21+ to use
 - 3) May use in public
 - 4) Allowed for medical use
 - 5) May own up to two plants
 - 6) Legal to sell

*Correct responses allowed for inclusion or exclusion of medical use since legal since 2004



Wave 1, Spring 2019

Awareness of state marijuana policy (2019)

- 60.1% of young adults correctly described VT policy
 - Ever and past 30day marijuana users
 → more likely to have correct knowledge
 - Younger, non-white, less educated → less likely to have correct knowledge

	Incorrect	Correct		
	Knowledge	Knowledge		
	(n = 400)	(n = 637)		
	Weighted %	Weighted %		
	(n)	(n)	aPR	(95%CI)
Young Adults				· · ·
Harm risk from weekly mari	juana use			
Great risk	13.9 (52)	4.5 (31)	0.66	(0.43, 1.01)
Moderate risk	25.3 (101)	19.3 (128)	1.09	(0.90, 1.32)
Slight risk	32.2 (143)	48.8 (309)	1.28	(1.11, 1.48)
No risk	28.5 (103)	27.4 (169)	Ref.	. , .
Regular marijuana use durin	g early years of l	ife can negatively	/ affect	
attention	0 , ,	0,		
Agree	73.9 (303)	82.1 (508)	1.55	(1.22, 1.97)
Disagree	16.3 (53)	8.3 (67)	Ref.	、 ,, , , , ,
Don't know	9.8 (43)	9.5 (62)	1.44	(1.06, 1.95)
Approximately 1 in 6 teens	who start using r	nariiuana before	age 14 d	evelop
addiction	0	,	0	
Agree	57.2 (230)	54.5 (337)	1.09	(0.93, 1.28)
Disagree	28.3 (104)	24.8 (165)	Ref	(0.7.0, 2.20)
Don't know	14 4 (65)	20.7 (134)	1 20	(1 01 1 43)
Teens who use marijuana ha	ave lower acader	nic performance a	and wors	e iob
prospects				
Δστρο	46 5 (178)	43 3 (261)	1 07	(0.93, 1.23)
Disagree	37.8 (146)	38 6 (259)	Ref	(0.70, 1.20)
Don't know	15 6 (75)	18 1 (116)	1 10	(0.93, 1.29)
Toons who use marijuana w	19.0 (7 5)	ton have twice th	no rick of	doprossion
	40 6 (220)	50 0 (262)		(0 01 1 22)
Disagroo	21 0 (230)	22 2 (150)	L.UJ Pof	(0.71, 1.22)
Disagree Dop't know	21.7 (71) 175 (70)	23.2 (137) 19 0 (117)	1 02	(0 05 1 22)
	17.3 (70)	10.0 (114)	1.02	(0.65, 1.25)
vvnat substance in marijuan	a makes a persol	n nign <i>:</i>		
Incorrect	19.1 (59)	4.9 (32)	Kef.	(4.00.0.70)
Correct (THC)	74.3 (309)	93.6 (594)	1.91	(1.30, 2.79)
l don't know	6.6 (32)	1.4 (11)	0.77	(0.38, 1.58)



West et al. Under review.
EVP and marijuana use

Ever and past 30-day electronic vapor product (EVP) and marijuana use by age group, PACE Vermont pilot study, 2019





Last time you vaped... (weighted)

Last time you vaped, what was in the mist you inhaled?





Waves 1-3, complete cases – Ever EVP users

Quit or cut down in past year? (weighted)

- Among past 30-day users:
 - 61% of EVP users tried to quit or cut down
 - 25% of marijuana users tried to quit or cut down

Top three reasons for quitting/cutting down on EVPs:

- 1. Health (81%)
- 2. Money/cost (61%)
- Freedom from addiction (41%)

Top three reasons for quitting/cutting down on marijuana:

- 1. Other (34%)
- 2. Money/cost (26%)
- 3. Health (25%)



Wave 3, Preliminary data

Fall 2019 vs. Fall 2020: Substance use

Past 30-day substance use in Vermont youth and young adults





Waves 3 and 4, Preliminary data

Change in substance use since COVID



substance use since the start of the COVID-19 pandemic



Wave 4, Preliminary data

Harm perceptions by age group, Spring 2021

How much do you think people risk harming themselves (physically or in other ways) if they use marijuana weekly?





Wave 6, Preliminary data

Marijuana beliefs, Spring 2021





Wave 6, Preliminary data

How does Vermont differ from national trends? Past month use

Adolescents

Young adults



https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-druguse-and-health



WHAT WORKS TO PREVENT SUBSTANCE USE IN YOUNG PEOPLE?

Community Guide to Preventive Services: Tobacco

Intervention	Outcomes Addressed	CPSTF Finding
Comprehensive Tobacco Control Programs	Cessation Initiation Secondhand Smoke Exposure	Recommended August 2014
Smoke-Free Policies	Cessation Initiation Secondhand Smoke Exposure	Recommended November 2012
Interventions to Increase the Unit Price for Tobacco Products	Cessation Health Disparities Initiation	Recommended November 2012
Mass-Reach Health Communication Interventions	Cessation Initiation	Recommended April 2013
Reducing Out-of-Pocket Costs for Evidence-Based Cessation Treatments	Cessation	Recommended August 2012
Quitline Interventions	Cessation	Recommended August 2012
Mobile Phone-Based Cessation Interventions	Cessation	Recommended December 2011
Internet-Based Cessation Interventions	Cessation	Recommended December 2019
Mass Media - Cessation Contests	Cessation	Insufficient Evidence May 2000



https://www.thecommunityguide.org/

Comprehensive tobacco control



Centers for Disease Control and Prevention. (2007). Best Practices for Comprehensive Tobacco Control Programs—2007. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.



New England laws re: e-cigarettes

	Prohibits e- cigarette use in worksites, restaurants, and bars	Retail license required to sell e-cigarettes over the counter	Self-service displays of e- cigarettes prohibited	Sales of tobacco products including e-cigarettes to persons aged <21 yrs prohibited	E-cigarette tax (tax rate)
Connecticut	—	Mar 1, 2016	Mar 1, 2016	Oct 1, 2019	Oct 1, 2019 (\$0.40/mL or 10%)
Maine	YES	Nov 1, 2017	Mar 3, 2016*	Nov 1, 2017 ^{§§}	Jan 2, 2020 (43%)
Massachusetts	YES	Jun 1, 2020	Sep 25, 2015*	Dec 31, 2018	Jun 1, 2020 (75%)
New Hampshire	YES	YES	—	FEDERAL (Dec 20, 2019)	Jan 1, 2020 (\$0.30/mL or 8%)
Rhode Island	YES	Jan 1, 2015	YES	FEDERAL (Dec 20, 2019)	—
Vermont	Jul 1, 2016	Jul 1, 2013	Jan 1, 2017	Sept 1, 2019	Jul 1, 2019 (92%)

https://www.cdc.gov/mmwr/volumes/66/wr/mm6649a1.htm; https://www.ncsl.org/research/fiscal-policy/electronic-cigarette-taxation.aspx; https://publichealthlawcenter.org/resources/us-e-cigarette-regulations-50-state-review



National Tobacco Prevention Campaigns



truth: https://thetruth.com FDA: <u>https://therealcost.betobaccofree.hhs.gov/</u>



VT – E-cigarette Prevention Campaign



Community Guide to Preventive Services: Alcohol

Intervention	CPSTF Finding				
Interventions Directed to the General Population					
Dram Shop Liability	Recommended (strong evidence) March 2010				
Electronic Screening and Brief Intervention (e-SBI)	Recommended (strong evidence) August 2012				
Increasing Alcohol Taxes	Recommended (strong evidence) June 2007				
Maintaining Limits on Days of Sale	Recommended (strong evidence) June 2008				
Maintaining Limits on Hours of Sale	Recommended (sufficient evidence) February 2009				
Overservice Law Enforcement Initiatives	Insufficient Evidence March 2010				
Privatization of Retail Alcohol Sales	Recommended Against April 2011				
Regulation of Alcohol Outlet Density	Recommended (sufficient evidence) February 2007				
Responsible Beverage Service Training	Insufficient Evidence October 2010				
Interventions Directed to Underage Drinkers					
Enhanced Enforcement of Laws Prohibiting Sales to Minors	Recommended (sufficient evidence) February 2006				

https://www.thecommunityguide.org/



Community Guide to Preventive Services: Cannabis?

NOTHING YET!





Comprehensive cannabis control



Adapted from Centers for Disease Control and Prevention. (2007). Best Practices for Comprehensive Tobacco Control Programs—2007. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.



Comprehensive cannabis control



Adapted from Centers for Disease Control and Prevention. (2007). Best Practices for Comprehensive Tobacco Control Programs—2007. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.



2012 Surgeon General's Report on Preventing Tobacco Use in Youth and Young Adults

Major Conclusions

- Cigarette smoking by youth and young adults has immediate adverse health consequences, including addiction, and accelerates the development of chronic diseases across the full life course.
- 2. Prevention efforts must focus on both adolescents and young adults because among adults who become daily smokers, nearly all first use of cigarettes occurs by 18 years of age (88%), with 99% of first use by 26 years of age.
- Advertising and promotional activities by tobacco companies have been shown to cause the onset and continuation of smoking among adolescents and young adults.

- After years of steady progress, declines in the use of tobacco by youth and young adults have slowed for cigarette smoking and stalled for smokeless tobacco use.
- 5. Coordinated, multicomponent interventions that combine mass media campaigns, price increases including those that result from tax increases, school-based policies and programs, and statewide or community-wide changes in smoke-free policies and norms are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

https://www.cdc.gov/tobacco/data_statistics/sgr/2012/index.htm



Health effects of cigarette smoking

- Smoking accounts for 480,000 deaths annually in the U.S.
 - ~1,300 smokingrelated deaths per day
- 5.6 million of today's youth expected to die prematurely from smoking



Immune function

Overall diminished health



https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/eff ects_cig_smoking/index.htm



Recent studies highlight relationship between cannabis marketing and youth use

Youth ages 15-19 (n = 482) (Trangenstein 2019 Drug Alcohol Depend)

- Online sample of youth living in states with legalized retail cannabis in 2018.
- Correlates of past-year cannabis use:
 - Liked or followed a cannabis business on at least one social media platform (*aOR*=5.00, *95% CI*: 2.47, 10.09, *p*<0.001).
 - Likely that they would own or wear cannabis-branded merchandise (*aOR*=6.93, *95% CI:* 4.45, 10.78, *p*<0.001)
 - Had a favorite cannabis brand (*aOR*=7.98, *95% CI*: 4.90, 13.00, *p*<0.001)

Youth ever cannabis users (n = 172) (Trangenstein 2021 J Stud Alc Drugs)

- Online sample of youth living in states with legalized retail cannabis in 2018.
- Correlates of cannabis use disorder:
 - Saw billboards rarely/sometimes had 5 times the odds of CUD
 - Saw billboards most/all of the time had 6 times the odds of CUD.
- Correlates of weekly cannabis use:
 - Saw billboards most/all of the time had 7 times the odds of weekly use
 - Owned/were likely to own branded merchandise had nearly 23 times the odds of weekly use
 - Those with a favorite brand had 3 times the odds of weekly use and CUD.



Marketing comes in many forms





Elements of appeal

- Product design
- Packaging and labeling
- Marketing
- Social acceptability
- Sensory experience
 - Subjective effects
 - Flavor





Elements of appeal are inextricably linked



Health claims \rightarrow Lower harm perceptions





Original investigation

American Spirit Pack Descriptors and Perceptions of Harm: A Crowdsourced Compa Misperceptions of harm among Natural American Jennifer L. Shari P. Feil Spirit smokers: results from wave 1 of the Jennifer Ca Population Assessment of Tobacco and Health (PATH) ctudy (2012 2014) Brief report Jennifer L P Lauren Colli Widespread Belief That Organic and Cassandra / Additive-Free Tobacco Products are Less Harmful Than Regular Tobacco Products: Results From the 2017 US Health Information National Trends Survey Jennifer L. Pearson MPH, PhD^{1,2,o}, Meghan Moran PhD², Cristine D. Delnevo PhD, MPH³, Andrea C. Villanti PhD, MPH^{2,4}, M. Jane Lewis DrPH³



Cannabis counter-marketing?

Operation CBDeceit

Despite what they say, **no CBD product is medically proven** to prevent, treat, or cure:

Alzheimer's

- anxiety
- arthritis
- autism
- autoimmune disorders
- bipolar disorders
- cancer
- cardiovascular issues
- childhood autism
- chronic pain
- colitis
- COVID-19
- Crohn's
- depression
- diabetes

- glaucoma
 - heart attacks
 - high blood pressure
- high blood sugar
 - hypertension
 - insomnia
 - irritable bowel syndrome
 - multiple sclerosis
 - overactive bladder
 - Parkinson's disease
 - psoriasis
 - PTSD
 - schizophrenia
 - strokes
 - substance abuse
- gastrointestinal disorders

- The official evaluation of the National Youth Anti-Drug Media Campaign campaign found that exposure to the ads resulted in pro-marijuana cognitions and greater initiation of marijuana use.
- Few states have launched mass media public education campaigns accompanying their cannabis sales policies.
 - None have published outcome evaluation data.



Source: Federal Trade Commission | consumer.ftc.gov

Anti-marijuana messaging

- Two print campaigns:
 - "Do the Math" (Liberty Alliance for Youth, Missouri)
 - "Spread the Facts" (NIDA)
- Three message topics:
 - Cognitive performance
 - Driving
 - Health harms
- Two studies:
 - Self-reported response
 - Psychophysiological response (lab) + self-report



Anti-marijuana messaging

Self-report

- N = 203 adults aged 18-76
- Greater message liking and perceived harm were robustly associated with perceived message effectiveness across all three topics.
- Greater negative affect and lower positive affect were correlated with higher perceived message effectiveness (fear appeal).

Stevens EM, Cohn AM, Villanti AC, Leshner G, Wedel A, Wagener TL. *J Stud Alc Drugs.* 2019;80(4):415-422. PubMed PMID: 31495378. PubMed Central PMCID: PMC6739640.

Lab + self-report

- N = 50 young adult marijuana users and nonusers
- Used psychophysiological assessment (heart rate, skin conductance, facial action coding) and self-report measures
- Driving-themed messages for both campaigns had the greatest cognitive resource allocation to encoding the message, the greatest arousal, and the most positive emotional response, regardless of user status.

Leshner G, Stevens EM, Cohn AM, Kim S, Kim N, Wagener TL, Villanti AC. *Drug Alcohol Depend*. 2021;225:108788. PubMed PMID: 34119879.



Vermont's Cannabis Education Campaigns

- Ongoing tracking in PACE Vermont re: awareness, exposure, liking, impact on behavior
 - Opportunity to evaluate impact and inform future efforts

OUTLNST





WHERE DO WE GO NEXT WITH STATE-LEVEL PREVENTION EFFORTS?

Status quo: Prevention & cessation



Why is young adulthood important?

• Young adulthood is defined by transition:



- Attaining legal age to vote, marry, buy tobacco products
- Moving from high school to college or work
- Moving out of parents' home
- Developmental period where adult health behaviors are established



All prevention efforts need to "age up" to meet minimum age laws




Summary

• Prevention strategies

- Should address adolescents AND young adults
- May have impacts on quitting or cutting down on marijuana use

Need to create linkages

 Public education, health communication, point-of-sale → Need to have health resources (e.g., treatment) listed AND available for potentially larger pool of marijuana users

Importance of comprehensive cannabis control program

- Development and coordination of novel surveillance, treatment, and prevention efforts to minimize negative impacts on health
- Ensure that marketing does not induce misperceptions







Ongoing challenges

- Addressing co-use of substances
- Increasing reach and efficacy of prevention interventions into young adulthood
- Increasing reach, efficacy, and uptake of treatment interventions in young people



To understand the impact of state-level policies and communication campaigns on substance use beliefs and behaviors in young Vermonters.





QUESTIONS?

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